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377

English Page 3

Keep pages 85 and 86 open when reading the Operating Instructions

Français Page 12

Déplier les pages 85 et 86 en lisant le mode d'emploi

Deutsch Seite 20

Bitte klappen Sie beim Lesen der Bedienungsanleitung die Seiten 85 und 86 aus

Nederlands Pag. 29

Sla bij het lezen van de gebruiksaanwijzing de pagina's 85 en 86 uit

Español Pág. 37

Mantenga abiertas las páginas 85 y 86 cuando lea las instrucciones de manejo

Italiano Pag. 46

Durante la lettura delle istruzioni per l'uso aprite le pagine 85 e 86

Dansk Side 55

Hold side 85 og 86 opslået, mens De læser brugsanvisningen

Norsk Side 62

Hold sidene 85 og 86 åpne når bruksanvisningen leses

Svenska Sida 70

Vik ut sidorna 85 och 86 när Ni läser bruksanvisningen

Suomi Sivu 71

Pidä sivut 85 ja 86 auki tutustuessasi käyttöohjeeseen

English

Controls and connection sockets

Figures 1 and 2

- ① reel spindles with locking clips
- ② recording level meter - left channel
- ③ overload indicator - left channel
- ④ overload indicator - right channel
- ⑤ recording level meter - right channel
- ⑥ monitor output level control - left channel
- ⑦ monitor output level control - right channel
- ⑧ line output level control - left channel
- ⑨ line output level control - right channel
- ⑩ line input sensitivity control - left channel
- ⑪ line input sensitivity control - right channel
- ⑫ tuner input sensitivity control - left channel
- ⑬ tuner input sensitivity control - right channel
- ⑭ 'aux' input sensitivity control - left channel
- ⑮ 'aux' input sensitivity control - right channel
- ⑯ phono input sensitivity control - left channel
- ⑰ phono input sensitivity control - right channel
- ⑱ hinged transparent cover
- ⑲ tape-tension stabilisers
- ⑳ memory switch for counter
- ㉑ counter
- ㉒ zero-reset button for counter
- ㉓ tape threading slot
- ㉔ detachable head-cover
- ㉕ cueing knob
- ㉖ microphone sensitivity switch
- ㉗ volume control
- ㉘ balance control
- ㉙ bass control
- ㉚ treble control
- ㉛ wind speed control
- ㉜ post fading control
- ㉝ lock button for post-fading control
- ㉞ recording level control - left channel
- ㉟ recording level control - right channel
- ㊱ microphone recording level control - left channel
- ㊲ microphone recording level control - right channel
- ㊳ line input selector
- ㊴ tuner input selector
- ㊵ 'aux' input selector
- ㊶ phono input selector
- ㊷ fast rewind key
- ㊸ fast wind key
- ㊹ start key
- ㊺ pause key (to disengage, press again)
- ㊻ record key
- ㊼ (record, playback and fast wind) stop key
- ㊽ monitor selector
- ㊾ track selector
- ㊿ speed selector

- ① DNL indicator
- ② DNL switch
- ③ socket for stereo headset
- ④ socket for mono microphone (left channel) or stereo microphone, can also be used as an extra input for radio, amplifier or recorder
- ⑤ socket for mono microphone (right channel)
- ⑥ phono equalisation selector
- ⑦ multiplay switch
- ⑧ function selector
- ⑨ mains switch
- ⑩ mains on/off-indicator
- ⑪ holes for the support-pins for horizontal use
- ⑫ carrying handle
- ⑬ mains-voltage selector
- ⑭ socket for mains lead
- ⑮ type plate
- ⑯ phono input socket for HiFi or non-HiFi record player
- ⑰ 'aux' input - auxiliary input socket for radio, amplifier or recorder
- ⑱ tuner input socket
- ⑲ line in/out - combined input/output socket for radio, amplifier or recorder
- ㉑ MFB output socket for MFB-loudspeaker enclosures
- ㉒ monitor output socket for radio, amplifier or recorder
- ㉓ remote socket - for start/stop remote control unit

Note: Do not expose the recorder for any great length of time to excessive heat from heating equipment or direct sunshine.

Removing the cover

Pull the lower side of the cover loose and lift it away from the hinge recesses. It is advisable to replace the cover when the recorder section is not in use.

Horizontal use

The recorder can be used either vertically or horizontally. For horizontal use the two support pins supplied can be inserted in the holes ⑪ at the rear of the recorder (fig. 2).

Connecting the recorder to the mains

Before connecting the recorder to the mains, ensure that voltage selector ③ is set to the local mains supply. If it is not, turn the voltage selector with a suitable screwdriver or one of the support pins supplied until the correct voltage value appears in the recess (fig. 2). Then insert the female plug of the mains lead in socket ⑭ and, after this, insert the mains plug in the wall socket.

Warning: Always disconnect the mains lead before opening the apparatus.

Note for users in Great Britain

When fitting a mains plug to the mains lead proceed as follows: The wires in the mains lead are coloured in accordance with the following code: Blue = Neutral, Brown = Live. As these colours may not correspond with the colour markings identifying the terminals in your plug proceed as follows: The Brown wire must be connected to the terminal which is marked with the letter L or coloured Red. The Blue wire must be connected to the terminal which is marked with the letter N or coloured Black.

Note: This apparatus must be protected by a 3 Amp Fuse if a 13 Amp plug is used or if any other type of plug is used by a 5 amp Fuse either in the plug or adaptor or at the distribution board. If in doubt consult a qualified electrician.

Switching on and off

The recorder can be switched on and off with mains switch (59). Indicator (60) lights when the recorder is switched on.

Note: If the tape moving, never switch off the recorder without first pressing stop key (47).

Adjustment for type of tape in use

Press in the narrow sides of the lower head cover (24) and remove (fig. 3).

- If tapes with a glossy rear side are used, bracket (X) must be to the left (fig. 4, position A).
- If rear side coated tapes are used, bracket (X) must be to the right (fig. 4, position B). This prevents undue wear of the felt pressure pad (Y).

Threading the tape

- Place a full reel of tape on the left-hand reel carrier (1). This reel must turn anti-clockwise when unwinding. Now draw out the top of reel spindle (1), turn it slightly and allow it to spring back on the reel. The reel is now clamped to the carrier. Attach an empty reel to the right-hand reel disc by proceeding in the same way.
- Check that cueing knob (25) is in its lower position.
- Unwind about 30 cm of tape and, holding it taut between both hands, lead it around the tape tension stabilisers (19) and through tape threading slot (23) (fig. 1).
- Still holding the tape taut, press the start of the tape against the core of the empty reel and turn this reel anti-clockwise until it begins to take up the tape.
- Press start key (44), keep it depressed until the leader tape and the metal switching foil have passed through tape threading slot (23), then press stop key (47).

Note: When metal reels with an insulated (e.g. plastic) centre are used, static build-up may occur if the equipment is used in dry atmospheric conditions. To reduce the effect of this problem we recommend the use of conductive plates which can be clamped between the locking clips (1) and the metal reels. These plates are available individually under service code 4822 466 80664.

Automatic stop

When the metal switching foil at the start and end of the tape passes the switching contact (4) (fig. 6), any depressed keys are automatically disengaged and the tape stops. This automatic stop operates during recording, playback and fast winding.

If tapes without metal switching foil are used, any depressed keys are disengaged by the integral tape-breakage protection mechanism.

Four-track system

This four-track recorder allows four recordings to be made over the full length of the tape. The four recording tracks lie above each other. Each tape can thus take four mono recordings or two stereo recordings (a stereo recording consists of two mono recordings).

- To make mono recordings on each of the four tracks, set track selector (49) to '1-4'. Only recording level meter (2) lights. You can now record on track 1. When the right-hand reel is full, transpose the two reels. Leaving the track selector at '1-4', your next recording will be on track 4. Again transpose the reels when the right-hand reel is full and set track selector (49) to '3-2'. Only recording level meter (5) lights. The recording which you now make will be on track 3. When the right-hand reel is full, again transpose the reels, leaving the track selector at '3-2'. Your fourth recording will be made on track 2. When the right-hand reel is again full, all four tracks contain mono recordings over their full length.

- To make two stereo recordings on the four tracks, set track selector (49) to stereo. Both recording level meters (2) and (5), now light. The recording which you now make will be on tracks 1 and 3. When the right-hand reel is full, transpose the two reels as before. Leaving the track selector at stereo, you can now make the second stereo recording, which will be on tracks 4 and 2. When the end of the tape is reached, both pairs of tracks contain stereo recordings over their full length.

Counter and memory stop

Make a habit of setting counter (21) to '0000' by pressing zero reset button (22) immediately after threading a tape. You can make a note of the counter reading at which each recording starts on the index card of the tape storage box. Later, you can swiftly locate any recording desired by re-winding or winding to the counter reading concerned. Note that the counter gives no indication as to the length or playing time of the tape.

If memory switch (20) is pressed in, the tape will stop automatically during fast winding, rewinding or playback when the counter passes '0000'. The

memory stop is not operative during recording. By setting the counter to '0000' when a recording is commenced, the beginning of this recording can, later, be swiftly located by pressing memory switch ②⑨ and then rewind key ④②. The memory stop is switched off by pressing switch ②⑩ again.

Fast winding/cueing

The wind speed can be varied, during fast winding and rewinding, by means of control ③①.

When function selector ⑤⑧ is in its lower position, cueing is made possible, during fast winding, by moving cueing knob ②⑤ to its upper position; this causes the tape to be held against the playback head. The recorded sound is played back at a speed that is controllable via wind speed control ③① and, with a little experience, particular parts of recordings can soon be recognized and thus, quickly located. *Note:* Do not leave the cueing knob in its upper position unnecessarily.

When switching from one tape travel function to another (e.g. fast rewinding to start), it is not necessary to depress the stop button first. The pause button ④⑤ does not operate during fast winding. When function selector ⑤⑧ is in its upper position, start key ④④ does not operate; fast winding and rewinding is possible but without the cueing function.

Dynamic Noise Limiter - DNL

The DNL suppresses tape noise without greatly affecting the naturalness of the music signal. It operates only during quiet passages and in the absence of signal on the tape, which is when noise is most apparent. The DNL operates during playback and during monitoring with monitor selector ④⑧ at 'A'. Thus recordings being made on this recorder are entirely unaffected by the DNL. The DNL is operated by switch ⑤②; indicator ⑤① lights when the DNL is switched on.

Connections

The recorder is fitted with DIN standard connection sockets. Equipment fitted with DIN connection sockets can be connected to the recorder using lead 4822 321 20207 (EL 3768/14). For the connection of equipment and accessories fitted with other than DIN plugs or sockets, adapter leads and plugs are available from your dealer.

In the interests of safety, consult your dealer if you wish to connect equipment not having a recorder connection socket (e.g. a TV-set).

- Socket ⑤③: output for stereo headset. With the groove in the headset plug opposite '+' the MFB-loudspeaker enclosures remain switched on.

With the groove opposite '-' the MFB-loudspeaker enclosures are switched off.

- Socket ⑤④: input for stereo microphone or for the left-hand channel mono microphone when making stereo recordings with two microphones. This socket also serves as an extra input for a radio, amplifier or second recorder. The recording level (also when using the unit as a control amplifier) is adjusted with control ③⑥, and, when using a stereo sound source, with the controls ③⑥ and ③⑦.

- Socket ⑤⑤: input for the right-hand channel mono microphone when making stereo recordings with two microphones. The recording level (also when using the unit as a control amplifier) is adjusted with control ③⑦.

- Socket ⑤⑥: input for record player. Switch ⑤⑥ must be in its upper position when using a non-HiFi pick-up cartridge (crystal or ceramic); in its lower position the pre-amplifiers are switched in for a HiFi pick-up cartridge (magnetic or HiFi-ceramic). For record players with a built-in pre-amplifier, switch ⑤⑥ must be in its upper position. Record players with built-in output amplifiers must be connected to socket ⑥⑦ or ⑥⑨.

- Socket ⑥⑦: auxiliary input for radio, amplifier, recorder, combined gramophone/amplifier or electronic organ.

- Socket ⑥⑧: tuner input. Radios and combined tuner/amplifiers can be connected to socket ⑥⑦ or ⑥⑨.

- Socket ⑥⑨: combined input/output (record and playback) for all equipment - radios, amplifiers, combined gramophone/amplifier and tuner/amplifier systems, tape and cassette recorders - fitted with a recorder or diode connection.

- Socket ⑦①: control amplifier output for MFB-loudspeaker enclosures. The input sensitivity control on the MFB-loudspeaker enclosures should be set to '1 V'.

- Socket ⑦②: monitor output for amplifier (allowing listening-in during recording) or for a second recorder (allowing simultaneous recording by two recorders). The monitor socket provides an output signal during use as a control-amplifier and both during playback and recording, except when the recorder is in the record/pause position with monitor selector ④⑧ in position 'A'.

- Socket ⑦③: socket for remote control unit, by which the tape can be started and stopped during recording and playback. When the remote control unit is employed, pause key ④⑤ must always be pressed, either together with start key ④④ for playing back or with start key ④④ and record key ④⑥ for recording.

Input and output controls

To overcome the large changes in output level caused when switching from one input source to another this recorder is fitted with adjustable inputs and outputs.

Input sensitivities can be adjusted as follows:

- Set function selector ⑤⑧ to its lower position.
- Press record key ④⑥.
- Set the recording level controls ③④ and ③⑤ to position '7'.
- Lift up cover ①⑧.
- Set the appropriate selector, determined by the input used, in its upper position:
 - Switch ③⑨ selects the line input ⑥⑨; The input sensitivity is set via the controls ①⑩ (left channel) and ①⑪ (right channel).
 - Switch ③⑨ selects the tuner input ⑥⑧; The input sensitivity is set via the controls ①⑫ (left channel) and ①⑬ (right channel).
 - Switch ④⑩ selects the 'aux' input ⑥⑦; The input sensitivity is set via the controls ①⑭ (left channel) and ①⑮ (right channel).
 - Switch ④① selects the phono input ⑥⑥; The input sensitivity is set via the controls ①⑯ (left channel) and ①⑰ (right channel).
- Play the connected apparatus and, using thumb or coin, turn the appropriate input sensitivity controls clockwise until the recording level meters ② and ⑤ indicate 100% during the loudest passages (fig. 5). The overload indicators ③ and ④ should *just fail to light*.
- When all the input sensitivities have been set, press stop key ④⑦.

The output levels from the recorder are also adjustable in order to match the recorder playback volume to that of other input sources connected to the amplifier. To set up the output voltage, a pre-recorded stereo tape is required.

- Connect the monitor socket ⑦① to the monitor input and the 'line in/out' socket ⑥⑨ to the tape recorder input of the amplifier.
- Thread the pre-recorded tape, set speed selector ⑤⑩ to the appropriate speed and set track selector ④⑨ to stereo.
- Set function selector ⑤⑧ to its lower position.
- Switch on or start a source connected to the amplifier (e.g. a tuner) and set to a particular volume.
- Press start key ④④ to commence playback.
- Alternately select on the amplifier tuner, recorder and monitor playback and compare the relative volumes of recorder and monitor playback with the tuner playback volume. The monitor output level can be adjusted with the controls ⑥ (left channel) and ⑦ (right channel) and the 'line out' output level with the controls ⑧ (left channel)

and ⑨ (right channel). Turn these controls clockwise (louder) or anti-clockwise (softer) to adjust the relative volumes.

Use of microphones

For microphone recordings you can connect two mono microphones, one to socket ⑤④ and the other to socket ⑤⑤, or a stereo microphone to socket ⑤④. Depending on the position of track selector ④⑨, the recordings made in each case will be either stereo or mono. For mono recordings you can, if desired, connect only one microphone to socket ⑤④ or ⑤⑤. For stereo recordings the mono microphone for the left channel must face the left and that for the right channel the right of the sound source. For speech recordings the distance between mouth and microphone should be about 30 cm. For music recordings, trials should be made to determine the most suitable positions.

To prevent unwanted recorder noise being picked up by the microphones, these should be placed away from the recorder.

If a large amount of background noise is present whilst making speech recordings, the clarity can be increased by setting the microphone sensitivity switch ②⑥ to '-20 dB' and reducing the distance between mouth and microphone to 5-10 cm. Switch ②⑥ should also be set to '-20 dB' if you are recording sounds at very high levels or with very high peaks (e.g. beatgroups).

Listening-in during recording (monitoring)

You can check what is going onto the tape by monitoring during recording. Monitoring through a headset is of particular advantage when making microphone recordings since it averts the danger of the microphone picking up sound from the loudspeakers and thus causing a whistling noise ('howling' or 'acoustic feedback'). By means of monitor selector ④⑧, which operates only during recording, you can choose between 'after tape' and 'before tape' monitoring.

- 'A' is the after tape switch position. The signal which the record head ①① (fig. 6) has put on the tape is reproduced immediately afterwards by the playback head ①②. Thus what you then hear is the signal as recorded. Note that with monitor selector ④⑧ at 'A' and the tape stationary (the pause key being engaged), the playback head gives no signal and so nothing is heard.

- 'B' is the before tape switch position. In this case what you hear is the signal as it sounds before the record head has put it on the tape. With monitor selector ④⑧ at 'B' and the tape stationary (the pause key being engaged), the signal as it sounds prior to recording is continuously heard.

To monitor, proceed as follows:

- Connect MFB-loudspeaker enclosures or a headset (see 'Connections') or connect an amplifier to monitor socket (71).
- Set monitor selector (48) to 'B' if the tape is stationary or to 'A' if the tape is running.
- Adjust the volume, balance and tone for the MFB-loudspeaker enclosures and/or the headset via the controls (27), (28), (29) and (30). When monitoring through an amplifier the volume etc. is adjusted on the amplifier.

Introduction to recording

- Copying of gramophone records and recording of radio programmes is permissible only insofar as copyright or other rights of third parties are not thereby infringed.
- The strength at which the sound is recorded on the tape determines the quality of the sound obtainable on playback. This 'recording level' is adjusted via the controls (36) and (37) when recording via the microphone sockets (64) and (65) and by the controls (34) and (35) for all other recordings. The recording level is checked by reference to the recording level meters (2) and (5) and the overload indicators (3) and (4). In mono recording with one mono microphone, control (36) is used for input via socket (64) and control (37) for input via socket (65).
- The recording level is correctly set if, during the loudest passages, the pointers of the recording level meters (2) and/or (5) deflect just to the 100% mark (fig. 5) and the overload indicators (3) and (4) just fail to light. If the level is too high or too low, either distortion or disturbing tape noise, respectively, will be heard on playback.
- During recording, any previously recording on the same part of the tape is automatically erased by the erase head (A) (fig. 6). You can, however, erase a recording without adding a new one by keeping all recording level controls at '0' as you record. Erasure is fastest with speed selector (50) at '19' (cm/s).
- Recordings being made from an apparatus having a recorder connection socket are not affected by the settings of the volume or tone controls of that apparatus.

Recording

- Connect the equipment from which you wish to record to the appropriate socket and set the corresponding input selector (38) . . . (41) to its upper position or, during microphone recordings, set all input selectors to their lower position.
- Set function selector (58) to its lower position.
- Set monitor selector (48) to 'B'.
- Set speed selector (50) to the speed desired. The

lowest speed gives the longest playing time, the highest speed the best sound quality.

- Set track selector (49) to stereo or - for mono recordings - to '1-4' or '3-2'.
- Press pause key (45).
- Press start key (44) and record key (46) at the same time.
- Allow the equipment connected to play, or speak or sing into the microphone and adjust the recording level as necessary.
- Now start recording by pressing pause key (45) again. Check the recording level from time to time and readjust it, gradually, if necessary.
- If required, set monitor selector (48) to 'A' for 'after tape' monitoring.
- For brief interruptions press pause key (45).
- To stop, press stop key (47).

N.B.: To record with two recorders simultaneously, connect the second recorder to monitor socket (71) and keep monitor selector (48) at 'B' during recording.

Playback

The recordings made can be reproduced through:

- Two MFB-loudspeaker enclosures connected to socket (70) and/or
 - A headset connected to socket (63) (see 'Connections'):
- Set function selector (58) to its lower position, set track selector (49) and speed selector (50) to the positions in which the recording was made, press start key (44), adjust the volume, balance and tone with the controls (27), (28), (29) and (30) and, if desired, switch on the DNL with switch (62).
- An amplifier (or radio, recorder or gramophone, serving as amplifier) connected to socket (69) (or (71)). Set function selector (58) in its lower position, adjust the amplifier for recorder playback and set track selector (49) and speed selector (50) to the positions in which the recording was made. Now press start key (44), adjust the volume, balance etc. on the amplifier and, if desired, switch on the DNL with switch (62).

Post-fading

It is possible, *during playback*, to fade-out and fade-in parts of the recording. This is particularly useful when undesired applause, announcements, background noise, etc. are present on the tape. Caution should be taken when using the facility, since incorrect use can spoil the recording. It is recommended that an old dispensable recording is used to gain experience of this facility as follows:

- Play the tape and take note of the start and duration in seconds of the piece to be faded-out.

- Rewind the tape to a point before the fading is required and press start key (44).
- Keep lock button (33) depressed with one hand and, as the undesired piece approaches, slide post-fading control (32) upwards with the other hand (the sound will now fade away). When sliding the post-fading control downwards, the sound will return. The fade-in and fade-out speed is determined by the speed at which the post-fading control is used.

Using the recorder as a control-amplifier

If you wish to use only the amplifier in combination with the MFB-loudspeaker enclosures and/or a headset connected, proceed as follows:

- Set function selector (58) to its upper position. The recorder section is now switched off (apart from fast winding and rewinding).
- Select the required sound source with the appropriate input selector (39) ... (41). The recording level controls (34) and (35) are not operative.
- If used as a microphone amplifier, all input selectors (39) ... (41) must be in their lower position and the recording level must be set with the controls (36) and (37) so that, during the loudest passages, the recording level meters (2) and (5) just touch '100%' (fig. 5). The overload indicators (3) and (4) are not operative. If 'howling' occurs, the distance between loudspeaker and microphone should be increased or the volume should be reduced.
- Set track selector (49) for stereo reproduction to stereo and for mono reproduction to '1-4' or '3-2'.
- Adjust the volume, balance and tone with the controls (27), (28), (29) and (30).

Mixing sounds

This recorder permits mixing of inputs from different sound sources e.g. a record player and a microphone, since it is equipped with separate recording level controls for the microphone inputs on the one hand and for all other inputs on the other. Thus, you may for example record gramophone records and announce them yourself via the microphone. In the case of mixed recordings, the recording level meters indicate the sum of both levels.

The mixing ratio can be adjusted and checked by monitoring during recording. It is advisable to use a headset for this, in order to avoid 'howling'.

Multiplay (sound-on-sound)

When multiplaying, you can combine several mono recordings with each other. These recordings are synchronised: they keep good time with each other, so that it is possible for example to record a

quartet in which every part is played all by yourself. First you make a normal recording on track 1. After rewinding the tape to the start, you can make your second recording on track 3, while adding, simultaneously, the first recording from track 1 to track 3. While making the second recording, you can listen to the first one via a headset, so the second recording is exactly synchronised with the first. Track 3 contains also the first and second recording. After rewinding, you make your third recording on track 1, while adding simultaneously the first and second recording from track 3 to track 1. While making the third recording you can listen to the first and second recording via a headset. Track 1 contains now the first, second plus third recording.

If desired you may proceed with a fourth and a fifth recording, but you should take into account the so-called 'transfer loss', i.e. the deterioration of the sound quality when repeatedly copying a recording. To minimise this loss of quality it is advisable to use the highest tape speed and to record the main part (e.g. melody) at the end.

During the first recording, multiplay switch (57) must be in its lower position. During the second, third etc. recording the multiplay switch must be in its upper position. After use, always set the multiplay switch to its lower position.

During multiplay recordings, set monitor selector (48) to 'B'.

Don't forget to switch track selector (49) to the other track before starting your next recording.

The recording level of the *new* recording is adjusted with either the control (34) and (35) or, during microphone recordings (in this case possible only via socket (54)), with control (36). The recording level of the recording *being added* is adjusted with control (37). The illuminated recording level meter indicates the sum of the recording levels, so it is advised to adjust the recording level of the new recording below normal, because the multiplay signal is still to be added.

The mixing ratio between the new recording and the recording being added can be checked and adjusted by monitoring during recording.

When the result of a multiplay recording is not satisfactory, this recording can be repeated, because the preceding recording is not erased.

Playback takes place in the normal way with track selector (49) in the position which was used last. The second last recording can, if desired, be erased.

Echo

With this recorder, echo recordings can be made, since the recorder is equipped with separate heads for recording and playback, which are

mounted in line (fig. 6). When making an echo recording, the signal just recorded on the tape by the recording head ④ is immediately reproduced by the playback head ⑤. This playback signal is then fed back to the recording head and recorded together with the original signal. The echo-effect is due to the distance between the two heads and depends on the tape speed used: at the relatively low speed of 4.75 and 9.5 cm/s, 'slow' echo effects are obtained and at the higher speed of 19 cm/s a 'quick' echo effect ('reverberation'), can be simulated.

Connect the monitor socket ⑦ by means of an additional stereo connecting lead 4822 321 20207 (EL 3768/14)

- to the line in/out socket ⑨ or the 'aux' input socket ⑥ when recording from the microphone. In this case, turn back a little the monitor output level controls ⑥ and ⑦. The recording level of the echo signal is now adjusted with the controls ③ and ⑤.
- to the stereo microphone socket ④ when recording from another sound source. Set microphone sensitivity switch ② to '-20 dB'. The recording level of the echo signal is now adjusted with the controls ③ and ⑦.

You can now make a mixed recording with the original signal and the echo signal provided by the monitor socket.

During recording, monitor selector ④ must be in position 'A'.

The recording level meters indicate the sum of the recording levels, so it is advised to adjust the recording level of the original signal below normal, because the echo signal is still to be added.

The mixing ratio between the original signal and echo signal can be heard through a headset.

Maintenance

It is advisable to remove at regular intervals the dust and dirt which has collected on the heads, and we advise you to do this using cleaning tape 811/CT, which is played through once as an ordinary tape. Doing this, bracket (X) (fig. 4) must be in position B. Cleaning should be carried after, say, every 50 hours of operation or, on average, once a month.

The heads may also be cleaned, however, using a soft cloth or a cotton bud. To clean in this way proceed as follows:

- Ensure that the recorder is disconnected from the mains.
- Press in the narrow sides of head cover ② and remove (fig. 3).
- Moisten the cloth or cotton bud with a little alcohol or proprietary cleaning spirit.
- Now clean the tape tension stabilisers ⑩, the

pins ⑥ (fig. 6), the tape guides ③, the fronts of erase head ①, recording head ④ and playback head ⑤, the capstan ⑦, the rubber pressure roller ⑧ and the switching contact ⑨. Never use any other cleaning agents and do not touch the heads with sharp or metal objects.

- Allow all parts to dry before replacing the head cover and reconnecting the recorder to the mains.
- The drive mechanism must not be lubricated!

Storage of tapes

After use, return each tape to its box, where it is protected against dust. Store the tapes at room temperature, not in the sun and away from magnetic fields created by the recorder, radio and TV-sets and loudspeaker enclosures.

Technical data

(subject to change without notice)

- Switchable for mains voltages of 110, 127, 220, and 240 V.
- Suitable without switching for 50 and 60 Hz A.C.
- Power consumption: approx. 35 W.
- Frequency range according to DIN 45 500/NAB:
 - 19 cm/s: 35-25,000 Hz/35-26,000 Hz;
 - 9.5 cm/s: 35-19,000 Hz/35-20,000 Hz;
 - 4.75 cm/s: 35-11,000 Hz/35-11,500 Hz.
- Signal-to-noise ratio, without DNL, acc. to DIN 45 500 and NAB:
 - 19 cm/s: > 60 dB;
 - 9.5 cm/s: > 60 dB;
 - 4.75 cm/s: > 58 dB.
- Improvement of the signal-to-noise ratio in the 4,000-14,000 Hz range using the DNL: > 10 dB.
- Wow and flutter according to DIN 45 500/NAB:
 - 19 cm/s: < 0.1%/ < 0.05%;
 - 9.5 cm/s: < 0.15%/ < 0.07%;
 - 4.75 cm/s: < 0.3%/ < 0.2%.
- Maximum speed deviation according to DIN 45 500: < ± 1%.
- Suitable for reels up to 18 cm diameter.
- Fast winding time for LP 18 (540 m of tape): < 180 s.
- Dimensions: 555 mm wide, 430 mm high, 210 mm deep.
- Weight: 10.3 kg approx.
- Socket ③, headphones: impedance 400-600 Ω (pins 4 and 5).
- Socket ④, micro l + st: sensitivity in position '0 dB': < 0.2 mV/2 kΩ (pins 1 and 4) or < 100 mV/1 MΩ (pins 3 and 5).
- Socket ⑤, micro r: sensitivity in position '0 dB': < 0.2 mV/2 kΩ (pins 1 and 4).
- Socket ⑥, phono: sensitivity in position 'X.TAL': < 0.6 mV/1.5 kΩ; position 'MD': < 0.6 mV/40 kΩ (pins 3 and 5), max. attenuation 27 dB approx.

- Socket ⑥7, aux: sensitivity $\leq 2 \text{ mV}/15 \text{ k}\Omega$ (pins 1 and 4) or $\leq 100 \text{ mV}/1 \text{ M}\Omega$ (pins 3 and 5), max. attenuation 30 dB approx.
- Socket ⑥8, tuner: sensitivity $\leq 100 \text{ mV}/100 \text{ k}\Omega$ (pins 3 and 5), max. attenuation 30 dB approx.
- Socket ⑥9, line in/out: sensitivity $\leq 2 \text{ mV}/20 \text{ k}\Omega$ (pins 1 and 4) or $\leq 100 \text{ mV}/1 \text{ M}\Omega$ (pins 3 and 5), max. attenuation 30 dB approx.; adjustable output level 0-1 V, $Z_o > 50 \text{ k}\Omega$ (pins 3 and 5, no output signal during recording).
- Socket ⑦0, MFB: output level 1 V/750 Ω (pins 3 and 5).
- Socket ⑦1, monitor: adjustable output level 0-1 V, $Z_o > 50 \text{ k}\Omega$ (pins 3 and 5, output signal both during recording and playback).
- Socket ⑦2, remote control (pins 1 and 5).

Available accessories

(subject to change without notice)

- LP 13-15-18, High Output HiFi longplay tape on reels of 13, 15 and 18 cm diameter.
- DP 13-15-18, High Output HiFi doubleplay tape on reels of 13, 15 and 18 cm diameter.
- ER 13-15-18 ML, empty reels of 13, 15 and 18 cm diameter.
- 4822 466 80664, one conductive plate for use with metal reels.
- 811/CT, cleaning tape, for cleaning the heads and tape guides. (Not available in Great Britain.)
- MFB-loudspeaker enclosures; details of the range of appropriate MFB-loudspeaker enclosures are available from your dealer.
- N 8214 and N 8308, omnidirectional electret HiFi microphones.
- N 8500, cardioid electret HiFi microphone.
- N 8403, electret HiFi stereo microphone.
- 4822 321 20211 (N 6206), connection/extension lead, length 5 m, for recording with two microphones and/or for extension of the microphone lead.
- N 6708, telephone coil, for the recording of telephone calls. *N.B.* The recording of telephone calls is prohibited in certain countries. (Not available in Great Britain.)
- 4822 321 20207 (EL 3768/14), stereo connecting lead, with 5-pole, 180° DIN plug at both ends.
- N 6325, electret HiFi stereo headset.
- N 6330, HiFi stereo headset with twelve extra diaphragms.
- N 6718, remote control unit for starting and stopping the tape, for use as hand- or footswitch, with switchable locking system.
- SK 10, splicing kit, for use when editing recordings.

Tekniset tiedot

(oikeus muutoksiin pidätetään)

- Säädetävissä seuraaville verkkojännitteille: 110, 127, 220 ja 240 V.
- Sopii sekä 50 että 60 Hz:n vaihtovirrälle.
- Tehontarve: n. 35 W.
- Toistoalue DIN 45 500/NAB:n mukaan:
19 cm/s: 35 ... 25 000 Hz/35 ... 26 000 Hz
9,5 cm/s: 35 ... 19 000 Hz/35 ... 20 000 Hz
4,75 cm/s: 35 ... 11 000 Hz/35 ... 11 500 Hz.
- Signaallikohinasuhde, ilman DNL:ää DIN 45 500:n ja NAB:n mukaan
19 cm/s: ≥ 60 dB
9,5 cm/s: ≥ 60 dB
4,75 cm/s: ≥ 58 dB.
- DNL parantaa signaallikohinasuhdetta 4000 ... 14 000 Hz: llä ≥ 10 dB: llä.
- Huojunta DIN 45 500/NAB:n mukaan
19 cm/s: $\leq 0,1\%$ / $\leq 0,05\%$
9,5 cm/s: $\leq 0,15\%$ / $\leq 0,07\%$
4,75 cm/s: $\leq 0,3\%$ / $\leq 0,2\%$.
- Nopeuden maksimivaihtelu DIN 45 500:n mukaan: $\leq \pm 1\%$.
- Suurin kelahalkaisija 18 cm.
- Pikakelausaika 18 cm LP-nauhakelalle (540 m nauhaa): ≤ 180 s.
- Mitat: 555 mm leveys, 430 mm korkeus, 210 mm syvyys.
- Paino: 10,3 kg.
- Pistukka ⑤③, kuulokkeet: impedanssi 400 ... 600 Ω (nastat 4 ja 5).
- Pistukka ⑤④, mikro v + st: '0 dB':n herkkyydellä: $\leq 0,2$ mV/2 k Ω (nastat 1 ja 4) tai ≤ 100 mV/1 M Ω (nastat 3 ja 5).
- Pistukka ⑤⑤, mikro o: '0 dB':n herkkyydellä: $\leq 0,2$ mV/2 k Ω (nastat 1 ja 4).
- Pistukka ⑥⑥, levysoitin: herkkyys asennossa 'x.tal' $\leq 0,6$ mV/1,5 k Ω , asennossa 'md' $\leq 0,6$ mV/40 k Ω , (nastat 3 ja 5), maks. vaimennus n. 27 dB.
- Pistukka ⑥⑦, lisälaite: herkkyys ≤ 2 mV/15 k Ω (nastat 1 ja 4) tai ≤ 100 mV/1 M Ω (nastat 3 ja 5), maks. vaimennus n. 30 dB.
- Pistukka ⑥⑧, viritin: herkkyys ≤ 100 mV/100 k Ω (nastat 3 ja 5), maks. vaimennus n. 30 dB.
- Pistukka ⑥⑨, tulo/lähtö: herkkyys ≤ 2 mV/20 k Ω (nastat 1 ja 4) tai ≤ 100 mV/1 M Ω (nastat 3 ja 5), maks. vaimennus n. 30 dB, säädettävä lähtötaso 0 ... 1 V, $Z_o \geq 50$ k Ω (nastat 3 ja 5, ei signaalia äänitettäessä).
- Pistukka ⑦⑩, MFB: lähtötaso 1 V/750 Ω (nastat 3 ja 5).
- Pistukka ⑦⑪, tarkkailu: säädettävä lähtötaso 0 ... 1 V, $Z_o \geq 50$ k Ω (nastat 3 ja 5, signaali sekä äänitettäessä että toistettaessa).
- Pistukka ⑦⑫, kauko-ohjain (nastat 1 ja 5).

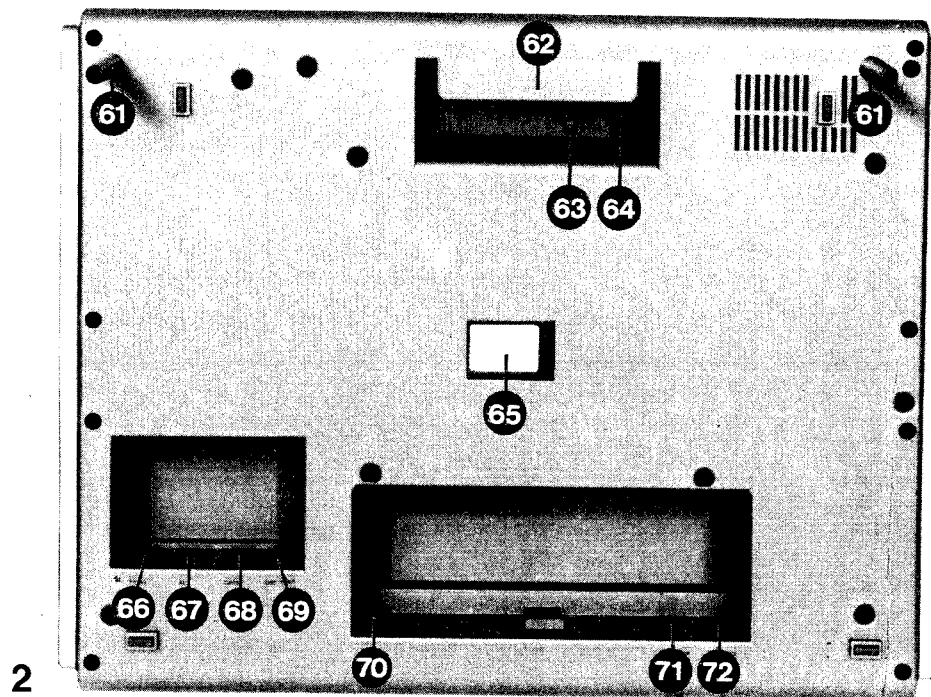
Lisävarusteet

(muutokset mahdollisia)

- LP 13-15-18, High Output HiFi pitkäsoitonauha, kelahalkaisijat 13, 15 ja 18 cm.
- DP 13-15-18, High Output HiFi kaksisoitonauha, kelahalkaisijat 13, 15 ja 18 cm.
- ER 13-15-18 ML, tyhjiä keloja.
- 4822 466 80664, johtavia levyjä (kun käytetään metallikeloja).
- 811/CT, puhdistusnauha.
- MFB-kaiuttimet: tietoja MFB-kaiuttimista saat myyjältä.
- N 8214 ja N 8308, pallomainen elektreetti HiFi mikrofoni.
- N 8500, kardioidi elektreetti HiFi mikrofoni.
- N 8403, elektreetti HiFi stereomikrofoni.
- 4822 321 20211 (N 6206), liitäntä/jatkojohto, pituus 5 m, kahdella mikrofoniin äänittämistä varten ja/tai mikrofoniin johdon jatkamiseen.
- N 6708, puhelinkuuntelulaite, puhelujen äänittämiseen. *Huom.* Puhelujen äänittäminen on kiellettyä joissakin maissa.
- 4822 321 20207 (EL 3768/14), stereoliitäntäjohto, jossa 5-napainen 180° DIN-pistoke molemmissa päissä.
- N 6325, elektreetti HiFi stereokuulokkeet.
- N 6330, HiFi stereokuulokkeet.
- N 6718, kaukosäätölaite nauhan käynnistykseen ja pysäytykseen, jalka- tai käsikäyttöinen, kytkettävä lukitusjärjestelmä.
- SK 10, nauhojen leikkaustarvikesarja, nauhojen leikkelyyn ja liittämiseen.



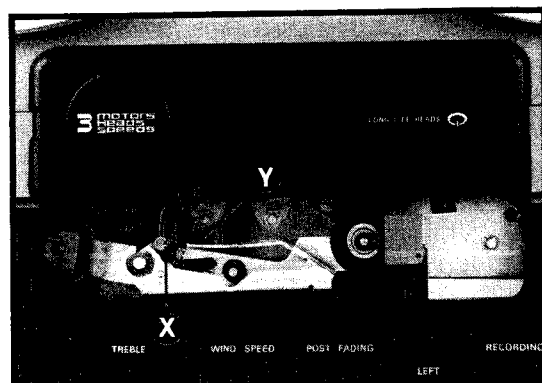
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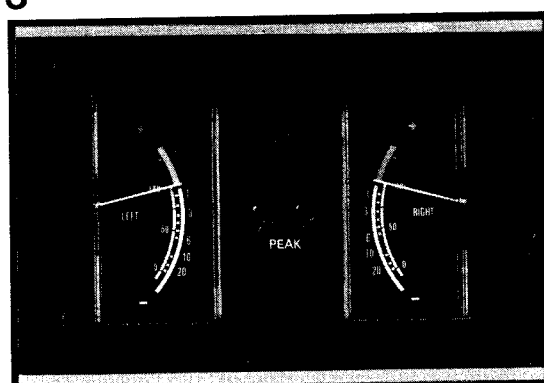
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